Computerized Screening for Appropriate Dosing of Renally Eliminated Medications

Ramona Skinner, M.S., James Caldwell, Pharm.D., Paul Vitale, Pharm.D.,
Anne Arundel Medical Center, Annapolis, Maryland

A method of rapid screening for appropriateness of certain drug doses is described. The program extracts patient information from a hospital mainframe computer system, performs an estimation of creatinine clearance (CrCl), and prints a report of patients, drugs, doses, and CrCl for patients within a specified CrCl range.

INTRODUCTION

Proper dose adjustment of renally eliminated drugs offers clear benefit to patients and hospitals.[1] Patients benefit by reduction of morbidity and mortality secondary to dose-related adverse drug reactions (ADRs). For institutions, reduction of treatment cost and prolonged length-of-stay associated with ADRs is essential to quality improvement programs and financial survival. Secondary benefit includes direct reduction in drug cost in patients with reduced renal function.[2,3,4]

Based on the above, a need for an efficient method of screening patients requiring dose adjustments based on renal function was identified by the pharmacy department. The information systems and pharmacy departments worked together to develop an in-house program utilizing data from the active patient information files on the mainframe system.

METHODS/RESULTS

A monitored drug dictionary (MDD) was developed to allow creation and maintenance of a list of drugs to monitor. The MDD was designed to pull names and mnemonic bases directly from the pharmacy's main drug dictionary. Queries in the beginning of the program identify which location(s) to search (default ALL), a specific range of CrCl to include (default 10-50 ml/min), and a designation of where to print.

The pharmacy's location/name index is used to search for all patients currently on any of the drugs listed in the monitored drug dictionary. If identified as on a monitored drug, the patient's most recent serum creatinine is obtained from laboratory data. An estimated CrCl is calculated, using the method of Jelliffe, and used to determine if a patient is within the range of CrCl specified.[5] Information from patients thus identified is placed into a temporary file. The temporary file is sorted by location, room, and then bed. A final report is generated which includes: room, account number, age, drugs and doses/intervals from the MDD drugs, most recent Blood Urea Nitrogen (BUN) and serum creatinine with dates, and the calculated CrCl. Reports take approximately 3 minutes to compile and print.

Reports can be quickly scanned by a pharmacist to compare reported doses/intervals to standard dosage recommendations. More information is obtained as needed from the computer or the patient's chart. Physicians are then contacted when doses appear truly excessive.

This program provides an efficient means of identifying patients at risk for preventable dose-related ADRs. Patient care is enhanced while the institution enjoys cost avoidance and reduction. Reporting by location allows application of the program in the patient focused care arena. It illustrates maximal use of computerized information to directly improve patient care in health care institutions.

References

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